U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO				Co	mplete if Known	OLD
			OSURF	Application Number	10/086,621	/ 4
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Filing Date	March 4, 2002 /	
				First Named Inventor	Valery KAGADEI, et al	HOV 1 2 30
				Group Art Unit	2838	- 4
(use as many sheets as necessary)				Confirmation No.	6897	\$
Sheet	1	of	2	Attorney Docket Number	KAGADEI=1	Renouse

		OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS	
xaminer	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	Τ²
KV	BB	ANISHCHENKO et al., Dry Cleaning of Fluorocarbon Residues by Atomic Hydrogen Flow, International Conference Micro- and Nanoelectronic, ICMN-2003, (October, 2003), pp. 1-6.	
	вс	ANISHCHENKO et al., Residual Photoresist Removal from Si and GaAs Surface by Atomic Hydrogen Flow Treatment, International Conference Micro- and Nanoelectronic, ICMN-2003, (October; 2003), pp. 1-5.	
	BD	BOZHKOV et al., A Comparative Study of the Atomic Hydrogen Penetration into the Thin Vanadium Films and Silicon Oxide-Gallium Arsenide Structures, Technical Physics Letters, Vol. 26, no. 10 (2000), pp. 926-928.	
	BE	CHALDYSHEV et al, Hydrogenation of GaAs Films Grown at Low Temperature, Symposium on Non-Stoichiometric III-V Compounds, (October, 2001), pp. 1-6.	
	BF	KAGADEI et al, Atomic Hydrogen Flux Density Measured Using Thin Metal Films, Technical Physics Letters, Vol. 29, no. 11 (2003), pp. 897-900.	
	BG	KAGADEI et al, Current-Voltage Characteristics of a Reflex Discharge with a Hollow Cathode and Self-Heating Electrode, Technical Physics, Vol. 46, no. 3 (2001), pp. 292-298. Publi Shed in Mar Di	j
1	вн	KAGADEĬ et al, The Effect of Atomic Hydrogen Flow on Electrical Resistance of the Transition Metal Films, The European Material Conference, E-MRS, (June, 2003), pp. 1-15.	
T	ВІ	KAGADEI et al, The Effect of Hydrogenation on the Photoconductivity of Ion-Doped Gallium Arsenide Structures, Technical Physics Letters, Vol. 26, no. 4 (2000), pp. 269-271.	
	ВЈ	KAGADEÏ et al, The Effect of Hydrogenation on the Sink Breakdown Voltage of Transistors Based on Ion-Doped Gallium Arsenide Structures, Technical Physics Letters, Vol. 29, no. 1 (2003), pp. 12-15.	
	ВК	KAGADEÏ et al, Hydrogenation Kinetics and Change in Resistance of Thin Vanadium Films Under Treatment by Atomic Hydrogen Flow, Izvestiya Vysshikh Uchebykh Zavedenii, Fizika, no. 11 (2003), pp. 67-76.	YE
	BL		
VV	ВМ	KAGADEÏ et al, Investigation of the Penetration of Atomic Hydrogen from the Gas Phase into SiO₂/GaAs, Journal of Vacuum Technology, Vol. 19 (2001), pp. 1871-1877	

Examiner Signature	4K	Date Considered	2-17-04

^{*} EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant: Applicant's unique citation designation number (optional). ² See Kind Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). *For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Ţ

	•	OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T2.
ţ.f	AC	LEONE, "Kinetic-Energy-Enhanced Neutral Etching", <u>Jpn. J. Appl. Phys.</u> , (1995), vol. 34, No. 4B, pages 2073- 2082	
	AD	ORLIKOVSKY, "Plasma Processes in Micro- and Nanoelectronics Part 1. Reactive Etching", <u>Microelectronics</u> , (1999), vol. 28, No. 5, Pages 344-362	XXX
		ROUSSEAU et al., "Pulsed microwave discharge: a very efficient H atom source", <u>J. Phys. D: Phys.</u> , (1994), vol 27, pages 2439-2441	
	AF	POPOV et al., "Electron cyclotron resonance plasma stream source for plasma enhanced chemical vapor deposition", <u>J. Vac. Sci. Technol A</u> , (1989), vol. 7, No. 3, pages 914-917	
	AG	KROON, "Removal of Oxygen for the Si(100) Surface in a DC Hydrogen Plasma", <u>Jpn. J. Appl. Phys.</u> , (1997), vol. 36, pages 5068-5071	
	АН	BARDOS et al., "Linear arc discharge source for large area plasma processing", <u>Appl. Phys. Lett.</u> (1997), vol. 70, No. 5, pages 577-579	
	Al	LIPPERT et al., "Soft Cleaning by <i>In Vacuo</i> Ultraviolet Radiation Combined with Molecular Hydrogen Gas before Molecular Beam Epitaxial Layer Growth", <u>J. Electrochem, Soc.</u> , (1995), vol. 142, No. 1, pages 191-195	
	AJ	SUGAYA et al., "Low-Temperature Cleaning of GaAs Substrate by Atomic Hydrogen Irradiation", <u>Japanese</u> <u>Journal of Applied Physics</u> , (1991), vol. 30, No. 3A/pages L402-L404	
	AK	WOLAN et al., "Chemical reactions induced by the room temperature interaction of hyperthermal atomic hydrogen with the native oxide layer on GaAs(001) surfaces studied by lon scattering spectroscopy and X-ray photoelectron spectroscopy", <u>J. Vac. Sci. Technol.</u> , (1997), vol 15, No. 5, pages 2502-2507	
	AL	KORZEC et al. "Characterization of a slot antenna microwave plasma source for hydrogen plasma cleaning", <u>J. Vac. Sci Technol.</u> , (1995), vol. 13, No. 4, page 2074-2085	
		EPI MBE Production Group. Aug./Sept., 1994, Applications Note, "On the Use of Atomic Hydrogen in MBE"	
Kr	AN	Application Note, "Cracking Efficiency of the EPI Atomic Hydrogen Source", EPI, January, 1996, No. 1/96	7 (
		NEUCIV	
Exami Signat		Date 2-17-5 9 NOV 2.7 200	
		TC 170	O

^{*} EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² Applicant is to place a check mark here if English language Translation is attached.

PTO/SB/08b (08-03)
Approved for use through 07/31/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Compl te if Known Substitute for form 1449A/PTO **Application Number** INFORMATION DISCLOSURE 10/086,621 March 4, 2002 Filing Date STATEMENT BY APPLICANT Valery KAGADEI, et a First Named Inventor Group Art Unit 2838 6897 (use as many sheets as necessary) Confirmation No. KAGADEI=1 Sheet | 2 of 2 **Attorney Docket Number**

		- Constant of the constant of	1383
		OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS	
	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T²
KF	BN	KAGADEI et al, Modeling Atomic Hydrogen Diffusion in GaAs, International Conference Micreo- and Nanoelectric, ICMN, (October, 2003), pp. 1-5.	
	во	KAGADEĬ et al, Simulation of the Production of Atomic Hydrogen in a Low-Pressure-Arc-Discharge-Based Source, Journal of Vacuum Technology, Vol. 19 (2001), pp. 1346-1352.	
	ВР	KAGADEI et al, Suppression of Parasitic Backgating by Hydrogenation of Ion-Doped Gallium Arsenide Structures, Technical Physics Letters, Vol. 25, no. 7 (July, 1999), pp. 522-523.	
	BQ	KAGADEI et al, Use of a New Type of Atomic Hydrogen Source for Cleaning and Hydrogenation of Compound Semiconductive Materials, Journal of Vacuum Technology, Vol. 16 (1998), pp. 2556-2561.	
	8R	Semenov et al, Gas-Discharge Sources with Charged-Particle Emission from the Plasma of a Hollow-Cathode Glow Discharge, Russian Physics Journal, Vol. 44, no. 9 (2001), pp. 977-986.	 -
	BS	Soltanovich et al., Study of Depth Distribution of Metastable Hydrogen-related defects in n-type GaAs, Physica B: Condensed Matter, Vol. 308-310 (July, 2001), pp. 827-830.	
K	ВТ	Tarasenko et al., Application of KrCl excilamp for cleaning GaAs surface using atomic hydrogen, SPIE, Vol. 3274, pp. 323-330.	
			-

Date Examiner 2-17-04 Considered Signature

^{*} EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

	OIP	E			PTO/SB/57 (10/96)
Gubstitute for form 1449A/P		E)	C	omplet if Known	
INFORMATIO	L NOV 0	4 2002 H	Application Numb r	10/086,621	
INFORMATIO	N DISC	LOSPRE	Filing Date	March 4, 2002	
STATEMENT	BY AP	PLI G ÄNT	First Named Inventor	V. KAGADEI et al.	
STATEMENT	779401	MARIE	Group Art Unit		
	y sheets as ne		Examiner Name		
Sheet 3	of	3	Attorney Docket Number	KAGADEI=1	
				<u> </u>	

		OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS	
Examiner Initials*	Cite No.¹	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T²
pr	AO	LIVSHITS et al., "Dissociation of hydrogen molecules on Metal filaments in H' ion sources", Plasma Cource Sci. Technol., (1994), pages 465-472	
	AP	HOFLUND et al., "Performance Characteristics of a hyperthermal oxygen-atom generator", Meas. Sci. Technol., (1994), vol 5, pages 201-204	
	AQ	MERFY et al., "Convenient source with a SHF-discharge in an elongated resonator for producing streams of hydrogen atoms" <u>Devices for Scientific Investigations</u> , (1979), vol. 5, Pages 121-122	XXX
	AR	GEDDES et al., "Dissociation for hydrogen in High frequency discharges", <u>Plasma Source Sci. Technol.</u> , (1993), vol. 2, pages 93-99	
	AS	RF Gas Cracker/Reactives Atom Source - HD Series, The product of Oxford Applied Research	
	AT	GOODMAN et al., "Ar, N ₂ , and Cl ₂ electron cyclotron resonance plasma measured by time-of-flight analysis: Neutral kinetic energies and source gas cracking", <u>J. Vac. Sci. Technol</u> , (1997), B vol. 15, No. 4, pages 971-982	
	AU	SHERMAN, "In Situ removal of native oxide from silicon wafers", <u>J. Vac. Sci. Technol.</u> , B vol. 8, No. 4, pages 656-657	
	AV	SAMANO et al., "An arc discharge hydrogen atom source", Rev. Sci. Instrum., (1993), vol. 64, No. 10, pages 2746-2752	
	AW	GOURRIER et al., "Growth of Dielectric Films of Semiconductors and Metals Using a Multipole Plasma", <u>Thin Solid Films</u> , (1981), vol. 84, Pages 379-388	
	AY	Handbook of Ion Sources, Ed. by Bernard Wolf, CRC Press, (1995), Pages 32-34, 54-56, 61, 69-71, 222-223	
	AZ	GABOVICH et al., "Out of plasma with high concentration of concentration of charged particles into vacuum", Journal of Technical Physics, (1961), vol. 31, No. 9, Pages 1049-1055	XXX
Ø	ВА	ITO et al., "Purification of diamond films by applying current into the plasma stream in the arc discharge plasma jet chemical vapor deposition technique", <u>J. Appl. Phys.</u> , (1995), vol. 77, No. 12, Pages 6636-6640	
		DECEME	·

Examiner Signature

Date Considered

NOV 2:7 2002

TC 1700

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ²Applicant is to place a check mark here if English language Translation is attached.

NUL	1 8 2002	Ú			•	PTO/SB/57 (10/96)	
Substitute for form 14.90 PTO				Complete if Known			
8	RANGE			Application Number	10/086,621		
INFO	RMATION D	ISC	CLOSURE	Filing Date	March 4, 2002	· · · · · · · · · · · · · · · · · · ·	
STAT	EMENT BY	ΔP	PLICANT	First Named Inventor	V. KAGADEI et al.		
•		•	,	Group Art Unit			
	(use as many sheets	as r	ecessary)	Examiner Name			
Sheet	2	of	3	Attorney Docket Number	KAGADEI=1		

		OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS						
Examiner Initials*	Cite No.1	Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T²					
pr	AC	LEONE, "Kinetic-Energy-Enhanced Neutral Etching", <u>Jpn. J. Appl. Phys.</u> , (1995), vol. 34, No. 4B, pages 20-73- 2082						
	AD	ORLIKOVSKY, "Plasma Processes in Micro- and Nanoelectronics Part 1. Reactive Etching", Microelectronics, (1999), vol. 28, No. 5, Pages 344-362	X					
	AE	ROUSSEAU et al., "Pulsed microwave discharge: a very efficient H atom source", J. Phys. D: Phys., (1994), vol 27, pages 2439-2441						
	AF	OPOV et al., "Electron cyclotron resonance plasma stream source for plasma enhanced chemical vapor eposition", <u>J. Vac. Sci. Technol A</u> , (1989), vol. 7, No. 3, pages 914-917						
	AG	KROON, "Removal of Oxygen for the Si(100) Surface in a DC Hydrogen Plasma", <u>Jpn. J. Appl. Phys,</u> (1997), vol. 36, pages 5068-5071						
	АН	SARDOS et al., "Linear arc discharge source for large area plasma processing", <u>Appl. Phys. Lett</u> , (1997), vol. 70, lo. 5, pages 577-579						
	AI	LIPPERT et al., "Soft Cleaning by <i>In Vacuo</i> Ultraviolet Radiation Combined with Molecular Hydrogen Gas before Molecular Beam Epitaxial Layer Growth", <u>J. Electrochem. Soc.,</u> (1995), vol. 142, No. 1, pages 191-195						
	AJ	SUGAYA et al., "Low-Temperature Cleaning of GaAs Substrate by Atomic Hydrogen Irradiation", <u>Japanese</u> <u>Journal of Applied Physics</u> , (1991), vol. 30, No. 3A, pages L402-L404						
	AK	WOLAN et al., "Chemical reactions induced nu the room temperature intersection of hyperthermal atomic hydrogen with the native oxide layer on GaAs(001) surfaces studied by ion scattering spectroscopy and X-ray photoelectron spectroscopy", <u>J. Vac. Sci. Technol.</u> , (1997), vol 15, No. 5, pages 2502-2507						
	AL	KORZEC et al. "Characterization of a slot antenna microwave plasma source for hydrogen plasma cleaning", <u>J. Vac. Sci Technol.,</u> (1995), vol. 13, No. 4, page 2074-2085						
	AM	EPI MBE Production Group. Aug./Sept., 1994, Applications Note, "On the Use of Atomic Hydrogen in MBE"						
18	AN	Application Note, "Cracking Efficiency of the EPI Atomic Hydrogen Source", EPI, January, 1996, No. 1/96						
			_					
Examir Signati		Date 2-17-00	1					

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ²Applicant is to place a check mark here if English language Translation is attached.

(JUN 18 7302				ð	PTO/SB/57 (10/98)
Substitute for form 1449 (8)	ro ro		Co	emplete if Known	
O IN AVEN			Application Number	10/086,621	
INFORMATIO	N DIS	CLOSURE	Filing Date	March 4, 2002	
STATEMENT	BY AF	PPLICANT	First Named Inventor	V. KAGADEI et al.	
•			Group Art Unit	·	
(use as man)	/ sheets as	necessary)	Examiner Name		
Sheet 3	of	3	Attorney Docket Number	KAGADEI=1	

Include name of the author (in CAPITAL LETTERS), title of article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published AO LIVSHITS et al., "Dissociation of hydrogen molecules on Metal filaments in H ion sources", Plasma Cource Sc Technol., (1994), pages 465-472 AP HOFLUND et al., "Performance Characteristics of a hyperthermal oxygen-atom generator", Meas. Sci. Technol. (1994), vol 5, pages 201-204 AQ MERFY et al., "Convenient source with a SHF-discharge in an elongated resonator for producing streams of hydrogen atoms" Devices for Scientific Investigations, (1979), vol. 5, Pages 121-122 AR GEDDES et al., "Dissociation fir hydrogen in High frequency discharges", Plasma Source Sci. Technol., (1993) vol. 2, pages 93-99	<u>I.,</u>
Technol., (1994), pages 465-472 AP HOFLUND et al., "Performance Characteristics of a hyperthermal oxygen-atom generator", Meas. Sci. Technol. (1994), vol 5, pages 201-204 AQ MERFY et al., "Convenient source with a SHF-discharge in an elongated resonator for producing streams of hydrogen atoms" Devices for Scientific Investigations, (1979), vol. 5, Pages 121-122 AR GEDDES et al., "Dissociation fir hydrogen in High frequency discharges", Plasma Source Sci. Technol., (1993)	<u>I.,</u>
(1994), vol 5, pages 201-204 AQ MERFY et al., "Convenient source with a SHF-discharge in an elongated resonator for producing streams of hydrogen atoms" Devices for Scientific Investigations, (1979), vol. 5, Pages 121-122 AR GEDDES et al., "Dissociation fir hydrogen in High frequency discharges", Plasma Source Sci. Technol., (1993)	X
hydrogen atoms" <u>Devices for Scientific Investigations</u> , (1979), vol. 5, Pages 121-122 AR GEDDES et al., "Dissociation fir hydrogen in High frequency discharges", <u>Plasma Source Sci. Technol.</u> , (1993)	
),
AS RF Gas Cracker/Reactives Atom Source - HD Series, The product of Oxford Applied Research	
AT GOODMAN et al., "Ar, N ₂ , and Cl ₂ electron cyclotron resonance plasma measured by time-of-flight analysis: Neutral kinetic energies and source gas cracking", <u>J. Vac. Sci. Technol</u> , (1997), vol. 14, No. 4, pages 971-982	
AU SHERMAN, "In Situ removal of native oxide from silicon wafers", <u>J. Vac. Sci. Technol.</u> , vol. 8, No. 4, pages 65 657	6-
AV SAMANO et al., "An arc discharge hydrogen atom source", Rev. Sci. Instrum., (1993), vol. 64, No. 10, pages 2746-2752	
AW GOURRIER et al., "Growth of Dielectric Films of Semiconductors and Metals Using a Multipole Plasma", Thin Solid Films, (1981), vol. 84, Pages 379-388	
AY Handbook of Ion Sources, Ed. by Bernard Wolf, CRC Press, (1995), Pages 32-34, 54-56, 61, 69-71, 222-223	
AZ GABOVICH et al., "Out of plasma with high concentration of concentration of charged particles into vacuum", Journal of Technical Physics, (1961), vol. 31, No. 9, Pages 1049-1055	X
BA ITO et al., "Purification of diamond films by applying current into the plasma stream in the arc discharge plasm jet chemical vapor deposition technique", <u>J. Appl. Phys.</u> , (1995), vol. 77, No. 12, Pages 6636-6640	а

Examiner Signature	KI		Date Considered	2-17-04	
	, ,	(_

^{*} EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ²Applicant is to place a check mark here if English language Translation is attached.

JUN 1 8 2000 S

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

neet	1	of	3

Complete if Known					
Application Number	10/086,621				
Filing Date	March 4, 2002	—			
First Named Invent r	V. KAGADEI et al.				
Group Art Unit					
Examiner Name					
Attorney Docket Number	KAGADEI=1				

				U.S. PATENT DOCUM	IENTS	
Examiner Initials*	Cite No.1	U.S. Patent Number	Document Kind Code ² (if known)		Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
OF	AA	5,336,533		BALMASHNOV et al.	Aug. 9, 1994	
ICF	AB	5,693,173		COLOMBO et al.	Dec. 2, 1997	
			\forall			<u> </u>
بر						

					N PATENT DOCUMEN	TS		γ
			Foreign Patent Nu	ımber	Name of Patentee or Applicant/Inventor of Cited Document	Date of Publication of Cited Document MM-DD-YYYY		To
Examiner Initials*	Cite No.1	Office ³	Number	Kind Code ⁵ (if known)				
KK	AX	RU	2088056		KAGADEJ et al.	Aug. 2, 1997		XXX
								L
Examir Signati			$V \subseteq$		Da	te nsidered	7-17-04	

^{*} EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WiPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ³ Kind of document by the appropriate symbols as indicated on the document under WiPO Standard ST.16 if possible. ⁸ Applicant is to place a check mark here if English language Translation is attached.